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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF APPROVING A NON-RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION APPLICATION FOR THE RIVER PROTECTION PROJECT-WASTE TREATMENT PLANT EAST OF THE 200-EAST AREA OF HANFORD FOR THE DEPARTMENT OF ENERGY-RICHLAND	)))))))	NOC APPROVAL ORDER **NUMBER: DE02NWP-002** AMENDMENT 1

To: Mr. James E. Rasmussen, Director
Environmental Management Division
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352

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FINDINGS:

On July 29, 2003, the United States Department of Energy, Office of River Protection (USDOE-ORP), submitted a modification request for the Notice of Construction (NOC) application for non-radioactive air emissions for the Hanford Tank Waste Treatment and Immobilization Plant (WTP), located East of the Hanford Site's 200 East Area.

In relation to the above, the Washington State Department of Ecology, (Ecology) pursuant to the Revised Code of Washington (RCW) 70.94.152, Washington Administrative Code (WAC) 173-400, and WAC 173-460 makes the following determinations:

- The facility, if operated as herein required, will be in accordance with applicable rules and regulations, as set forth in Chapter 173-400 WAC and 173-460 WAC, and the operation thereof, at the location proposed, will not result in ambient air quality standards being exceeded.
- The proposed project, if constructed and operated as herein required, will provide all known, available, and reasonable methods of emission control.
- USDOE has elected to take a federally enforceable limit on the number of hours for three of the six steam generating boilers, two diesel fire pumps, and three emergency diesel generators that will operate each year.

1. LAWS AND REGULATIONS

All proposed activities associated with the construction and operation of the WTP by USDOE-ORP, referred herein to as the permittee, shall comply with all requirements as specified in:

- RCW Chapter 70.94, Washington Clean Air Act
- WAC Chapter 173-400, General Regulations for Air Pollution Sources
- WAC Chapter 173-460, Controls for New Sources of Toxic Air Pollutants
- Title 40 Code of Federal Regulations (CFR) Part 60, New Source Performance Standards (NSPS): Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units)

2. EMISSIONS

Operation of the proposed facility at the specified site will generate the following estimated emissions of criteria and toxic air pollutants:

POLLUTANT	TONS/YEAR
PM-10	>15 Covered by PSD
Sulfur Oxides	11.47
Nitrogen Oxides	> 40 Covered by PSD
Volatile Organic Compounds, total	33.60
Carbon Monoxide	70.59
Lead	0.01
Ozone Depleting Substances	0.00
Toxic Air Pollutants	As specified in Tables in attachment 1

3. BACT

WAC 173-400-123 requires the use of Best Available Control Technology (BACT) to control emissions. This project will use measures and emission limits described in this order, in the Notice of Construction Application, in the BACT report (24590-WTP-RPT-ENV-01-006) and in the Operation and Maintenance Manuals (O&M) to attain BACT.

Several criteria pollutants will be released from the WTP at levels below the Prevention of Significant Deterioration (PSD) significance levels, including SO_2, Volatile Organic Compounds (VOCs), CO, and lead. The majority of these emissions result from the combustion of diesel fuel in the steam boilers.

BACT for SO_2 is the use of Ultra-Low Sulfur Fuel (fuel oil with sulfur content of less than 0.0030% by weight) in the boilers and generator engines.

Ninety-nine percent of the lead emissions from the WTP come from the combustion of diesel fuel in the boilers and generator engines. However, only trace amounts of lead will be released from the WTP. The lead emission is estimated to be approximately 0.01 tons/yr (or 26 lbs/yr). This is approximately two orders of magnitude below the PSD significance limit of 0.6 ton/yr (or 1,200 lb/yr).

The combustion of diesel fuel in the steam boilers will be the primary source of emissions of CO and VOCs. BACT for these pollutants is defined as the application of good combustion practices for the boilers. Examples of good combustion practices may include visual combustion check, air supply check, burner inspection, and periodic boiler tune-ups in accordance with manufacturer's recommendations.

4. T-BACT

WAC 173-460-040(4)(b) requires the use of Best Available Control Technology for Toxics (T-BACT) to control toxic emissions. This project will use measures and emission limits described in this order, in the Notice of Construction Application, and in the T-BACT report (24590-WTP-RPT-ENV-01-005), to attain T-BACT.

High Efficiency Particulate Air (HEPA) filters with a removal efficiency of 99.95 percent (%) for single stage filtration and 99.9995% for two stage filtration are T-BACT for the control of particulates and aerosols. The off-gases from Low Activity Waste (LAW) and High Level Activity Waste (HLW) melters are characterized as high temperature streams. Therefore, additional equipment, such as quenching and mist elimination equipment, will be required to protect the HEPA filters in the HLW and LAW vitrification plants.

Caustic scrubbers with a removal efficiency of 97% are T-BACT for the control of acid gases in the pretreatment and LAW vitrification plants. A silver mordenite adsorber is T-BACT for the removal of halogens (precursors to acid gases) in the HLW vitrification plant off-gas. The silver mordenite will have a removal efficiency for halogens of 99.9%.

Thermal oxidizers with a removal efficiency of 99% or thermal catalytic oxidizers with a removal efficiency of 95% are T-BACT for the control of VOCs in the pretreatment, LAW vitrification, and HLW vitrification plants.

ADDITIONAL FINDINGS:

The WTP will convert mixed wastes from the Hanford Site double shell tank (DST) system to a solid vitrified form of borosilicate glass. The WTP is expected to have a lifespan of approximately 40 years, and is designed to produce a maximum of 56 metric tons per day of vitrified product and assumes maximum constituent feed concentrations as specified in the *Integrated Emissions Baseline Report for the Hanford Tank Waste Treatment and Immobilization Plant* (24590-WTP-RPT, PO-03-008, Rev 0).

1. PROCESS DESCRIPTION

The WTP is being developed to store and treat mixed waste from the Hanford Site DST system. The WTP will consist of three main processes: pretreatment, LAW vitrification, and HLW vitrification. Tank waste is received in the pretreatment facility, where it is separated into LAW, and HLW feeds. The LAW feed consists primarily of the aqueous-phase supernatant containing soluble solids but with most of the transuranic (TRU) radionuclides and cesium removed. The HLW feed is primarily an aqueous slurry with a higher solids content than the LAW feed. The constituents of potential concern are the same for both the LAW and HLW feed streams, but the HLW feed has a much higher concentration of radionuclide constituents of potential concern.

Waste will be immobilized in the form of a glass matrix contained in stainless steel containers. Off-gas generated by the pretreatment and vitrification processes will be treated in independent off-gas treatment systems. Typical off-gas streams include process vessel ventilation, melter off-gas, and exhaust from fluidic transfer devices.

The treated off-gases from pretreatment, LAW, and HLW vitrification processes are vented to the atmosphere through flues (or emission units). Additionally, the process plants are provided with building ventilation systems. Treated building air ventilation systems are also vented through dedicated flues. For each process facility, the flues, with exception of the C2 air flue, are contained within a stack structure. The C2 air is vented through a separate stack.

The WTP will consist of 20 emission units from pretreatment (5 emission units), LAW vitrification (4 emission units), and HLW vitrification (8 emission units) plants that will emit non-radioactive emissions. Additionally, the WTP will have an onsite analytical laboratory to support sampling and analysis activities. The analytical laboratory will consist of three emission units: LB-C2, LB-S1, and LB-S2. Flues LB-S1 and LB-S2 are within the laboratory stack. WTP will also include support systems and utilities required for the waste treatment process. Those systems will be provided by the various areas known as the "balance of facilities" (BOF). The BOF systems that will emit non-radioactive emissions include:

- Cooling tower
- Diesel generators
- Field erected tanks
- Fire water pump
- Glass former storage area
- Out-of-service melter storage areas
- Boilers
- Water treatment plant
- Wet chemical storage area

Secondary waste streams such as liquid effluents or solid waste generated during waste processing, off-gas treatment, or sample analysis will be recycled into the waste treatment process or transported to permitted facilities for storage or disposal.

2. VENTILATION AND EMISSIONS CONTROL SYSTEMS

2.1 Pretreatment Plant Off-Gas and Ventilation Treatment Systems

The pretreatment plant off-gas treatment systems will consist of two off-gas streams. One stream will be from pretreatment vessel vents, and the other stream will be exhaust from reverse flow diverters (RFDs) and pulsed jet mixers (PJMs). The process vessel vents will be treated through a caustic scrubber, high-efficiency mist eliminator (HEME), a volatile organic compounds oxidation unit, and carbon bed adsorbers. The RFD/PJMs off-gas will be treated through demisters and HEPA filters. The treated streams will be sampled and vented through flues PT-S3 and PT-S4.

The following provides descriptions of the pretreatment off-gas treatment components:

- Air inlet (air purge system)
- Collection (exhaust piping system)
- Vessel vent caustic scrubber
- HEMEs (PT-S3 emission unit) and pre-heaters
- Demisters (PT-S4 emission unit)
- Volatile organic compounds oxidation unit
- Carbon bed adsorbers

<u>Air Inlet (Air Purge System)</u>

Because the pretreatment process system design will be essentially an airtight design, the overall gas exhaust flow (except for evaporation, boiling, etc.) will be directly dependent on the air purge rates provided to each individual process vessel.

Continuous air purge to process vessels will be the primary control strategy for radiolytic produced hydrogen. Additional airflow above the minimum hydrogen control rate may be introduced to each vessel to help balance the system and ensure that all vessels are obtaining the minimum required flow. Additional airflow above the minimum for hydrogen dilution will also be introduced to individual vessels to remove heat by evaporative cooling. This function will help prevent boiling of self-heating tanks during an extended shutdown.

The air inlet header system will be fitted with balance and control valves to regulate flow and a flow measurement device. Each inlet header will obtain air, at atmospheric pressure, from a C3 area and flow to a group of tanks. The supply lines will be designed for the desired balance and total flow regulated at the inlet by the valves. The balance and control valves will protect the C3 area from cross contamination in the unlikely event of reverse airflow.

Collection (Exhaust Piping System)

From the individual process vessels, a vent line will route exhaust to a sub-header, usually one for each cell or group of vessels within a cell. The connection to the sub-headers from the process vessels will be arranged, where possible, to maintain airflow from normally lower activity vessels to (or past) normally higher activity level vessels. This will help prevent contamination of lower activity vessels due to potential reverse flow or in-breathing. The sub-header locations and the overall flow scheme will also be influenced by the plant layout and by the physical location of the major vessel vent headers.

Final sizing of the individual exhaust vent lines will be determined by airflow, process pump capacities for filling vessels, and other potential pressurization scenarios. The individual exhaust vent lines, the sub-headers, and the headers will also be sized to minimize overall pressure drop and help balance the system.

Vessel Vent Caustic Scrubber

The vessel vent exhaust streams will be collected for treatment in the caustic scrubber. The scrubber removes radioactive aerosols, acid gases, and NO_x emissions. The caustic scrubber will be a column with a bed filled with packing material. Sodium hydroxide solution flows down through the bed while the off-gas enters the bottom and is drawn up through packing and caustic solution. Contact between the gas and the liquid in the bed causes a portion of the NO_x in the vent gas to dissolve and form sodium nitrate. The scrubbing liquid collects in the sump of the column, and any excess overflows to pretreatment effluent collection.

After leaving the scrubber, the off-gas will flow to the HEMEs. The HEMEs will prevent droplet carryover. Positioning the scrubber upstream of the HEMEs will saturate the gas flow and enable the HEMEs to avoid damage from dry operation. The scrubber will be provided with a bypass line and valve. The bypass function will permit continued operation of the hydrogen control system in the unlikely event that the scrubber becomes plugged or disabled, or during maintenance activities. Waste feed processing will be halted prior to initiating use of the bypass line.

High Efficiency Mist Eliminators and Pre-Heater

The HEME will be composed of regenerable deep-bed fiber filters configured in an annular shape to remove fine aerosols. Gas flows from the outside to the inside hollow core, where the treated gas exits at the top and the liquid collects at the sealed bottom in a drainpipe. The HEME will operate wet so that as the liquid aerosols accumulate, they form a liquid film on the filter element and then drop to the drainpipe. Intermittent water spraying of the filter elements will be used to treat the vessel vent off-gas stream.

Three separate HEMEs will be used to treat the vessel vent off-gas streams. This configuration will permit washing each HEME while it is offline. The HEME effluent will be discharged to a drain vessel and then to an effluent vessel.

After treatment in a HEME, the vessel ventilation off-gas stream will be heated by the hot air injection system prior to processing through the oxidation unit. The hot air injection system draws air through HEPA filters from a C3 area. The air will be heated with an electric inline heater so that the combined air stream will be above its dew point to prevent condensation in the HEPA filters.

Demisters

The demister vessels will be provided with a number of segmented filter elements that are configured to form a set of long cylindrical filter candles to remove fine aerosols under dry operating conditions. The RFD and PJM exhausts will flow from the outside to the inside hollow core, from which the clean gases will exit the top.

Three separate demisters will be used to treat the RFD and PJM exhausts. This configuration will allow periodic washing of each demister while it is offline. The washing fluid will be discharged to a drain collection vessel.

After treatment in the demisters, the RFD and PJM exhausts will be mixed with heated C3 area air to maintain a desired relative humidity prior to treatment through the HEPA filters.

Volatile Organic Compound Oxidation Unit

A skid mounted VOCs oxidation unit will remove VOCs from the vessel vent stream. This unit will oxidize the VOCs to carbon dioxide, water, and a small amount of acid gases. The skid will be comprised of a heat recovery exchanger, an electric heater, and a residence time chamber for the VOC unit.

The vessel vent stream will be preheated in the heat recovery unit using heat recycled from the thermal oxidation unit off-gas. The electric heater will be used to further heat the vessel vent stream to the temperature required at the inlet of the thermal oxidation unit.

Carbon Bed Adsorbers

Two parallel carbon beds will be provided after the oxidation unit. The carbon beds will further reduce volatile organic compounds from the off-gas stream. The volatile organic compounds oxidation unit is designed to remove most of the volatile organic compounds from the vessel vent and the carbon beds will remove the remaining volatile organic compounds.

2.2 LAW Vitrification Plant Off-Gas and Ventilation Treatment

The LAW vitrification plant will consist of four separate flues (emission units): LV-C2, LV-S1, LV-S2, and LV-S3 that will emit radionuclide emissions. The emission sources to flue LV-C2, LV-S1, and LV-S2 consist of off-gases from plant building air supply systems. The off-gases from those streams are expected to be particulate at normal temperature. The emission sources to flue LV-S3 consists of off-gases from LAW melter and process vessels. This stream is expected to contain particulates, radioactive gases, volatile organics, and acid gases at relatively high temperature and moisture content.

2.2.1 LAW Melter Off-Gas System

The proposed LAW melter off-gas system consists of the following systems:

- LAW primary off-gas process system
- LAW secondary off-gas/vessel vent process system

Melter off-gas will be generated from the vitrification of LAW in the Joule-heated ceramic melters. The rate of generation of gases in the melters will be dynamic and not steady state. The melters will generate off-gas resulting from the decomposition, oxidation, and vaporization of feed material. Constituents of the off-gas include:

- Nitrogen oxides (NO_x)
- Chloride, fluoride, and sulfur as oxides, acid gases, and salts
- Radionuclide particulates and aerosols

In addition, the LAW melters will generate small quantities of other volatile compounds including iodine-129 (^{129}I), carbon-14 (^{14}C), tritium (^{3}H), and volatile organic compounds.

The purpose of the LAW off-gas system is to cool and treat the melter off-gas and vessel ventilation off-gas to a level that is protective of human health and the environment. The off-gas system must also provide a pressure confinement boundary that will control melter pressure and prevent vapor release to the cell. The design of the melter off-gas systems needs to accommodate changes in off-gas flow from each melter without causing other melters to pressurize and without allowing variations in the flow from one melter to impact other melters.

Separate systems will be provided for the initial decontamination of off-gas from each melter. This is known as the primary off-gas treatment system. The primary off-gas system is designed to handle intermittent surges of seven times steam flow and three times non-condensable flow from feed. The primary system consists of a film cooler, submerged bed scrubber (SBS), and a wet electrostatic precipitator (WESP). This system will cool the off-gas and remove particulates.

Additionally, an extra line from the melter to the SBS is provided in the unlikely case that the primary off-gas line plugs. This extra line is composed of a film cooler and a butterfly valve as the isolation device. As soon as the melter vacuum decreases to a set point, the butterfly valve is actuated and off-gas flow is allowed through the line to the SBS, thereby preventing melter pressurization. In the event that the melter surge is much higher than the system is designed to handle, a pressure relief device acts as the pressure relief point venting the off-gas to the wet process cell.

The vessel ventilation headers will be combined with the WESP off-gas and routed to the secondary off-gas treatment system. The secondary off-gas system will be designed to handle maximum sustained flow rate from the melters, assuming all melters are operating. The system will be capable of operating effectively if only one melter is running. The secondary off-gas system will consist of HEPA filters with pre-heater, exhauster fans, a carbon bed adsorber, a catalytic oxidizer/reducer unit, and a caustic scrubber. The following sections provide descriptions of melter off-gas treatment components.

2.2.2 LAW Primary Off-gas Process System

The purpose of the primary off-gas treatment system is to cool the off-gas and remove aerosols generated by the melter. The primary components consist of a film cooler, an SBS, and a wet electrostatic precipitator.

Film Cooler

The function of the film cooler is to cool the off-gas below the glass sticking temperature to minimize solids deposition on the off-gas piping walls. The off-gas exits the melter and is mixed with air or a steam/air mixture in the off-gas film cooler. Each melter has a film cooler. The film cooler is a double-walled pipe designed to introduce injected gas axially along the walls of the off-gas pipe through a series of holes or slots in the inner wall.

Submerged Bed Scrubber

Each LAW melter has a dedicated SBS. After each film cooler, the off-gas enters the SBS column for further cooling and solids removal. The SBS is a passive device designed for aqueous scrubbing of entrained radioactive particulate from melter off-gas, cooling and condensation of melter vapor emissions, and interim storage of condensed fluids. It will also quench the off-gas to a desired discharge temperature through the use of cooling coils/jacket. The off-gas leaves the SBS in thermal equilibrium with the scrubbing solution.

The SBS has two off-gas inlets, one for the normal operations line and one for the standby line. The off-gas enters the SBS through the appropriate inlet pipe that runs down through the center of the bed to the packing support plate. The bed-retaining walls will extend below the support plate creating a lower skirt which will allow the formation of a gas bubble underneath the packing. The entire bed is suspended off the floor of the SBS to allow the scrubbing solution to circulate freely through the bed. After formation of the gas bubble beneath the packing, the injected off-gas then bubbles up through the packed bed. The rising gas bubbles also cause the scrubbing liquid to circulate up through the packed bed, resulting in a general recirculation of the scrubbing solution. The packing breaks larger bubbles into smaller ones to increase the gas to water contacting surface, thereby increasing particulate removal and heat transfer efficiencies. The warmed scrubbing solution then flows downward outside of the packed bed through cooling coils/jacket.

The scrubbed off-gas discharges through the top of the SBS and is routed to the wet electrostatic precipitator (one per melter) for further particulate removal.

Wet Electrostatic Precipitator

The SBS off-gas is routed to the WESP for removal of aerosols down to and including sub-micron size. Each melter system has a dedicated wet electrostatic precipitator. The off-gas enters at the bottom of the unit and passes through a distribution plate. The evenly distributed saturated gas then flows through the tubes. The tubes act as positive electrodes. Each tube has a single negatively charged electrode, which runs down the center of the tube. A high voltage, direct current transformer supplies power to the electrodes. A strong electric field is generated along the electrodes giving a negative charge to the aerosols passing through the tubes. The negatively charged particles move towards the positively charged tube walls for collection. Collected particles are then washed from the tube walls along with collected mists. As the gas passes through the tubes, the first particles captured are the water droplets. As the water droplets gravity drain through the electrode tubes, the collected particles are washed off, and the final condensate is collected in the wet electrostatic precipitator dished bottom area. A water spray may be used periodically to facilitate washing collected aerosols from the tubes. The tube drain and wash solution are routed to a collection vessel.

2.2.3 Standby Primary Off-gas Treatment System

The standby line consists of an off-gas duct from the melter to the SBS and a pressure relief device. The standby off-gas duct will extend to the bottom of the SBS packed bed, identical to the main off-gas line. It is the same size as the main off-gas line, thus providing a doubling of flow cross-section for melter-generated gases. During an unlikely event of melter surge, the pressure relief device valve will open rapidly, providing an alternative path for the melter off-gas to flow. With this alternative routing, pressure control on the melter plenum can be maintained.

2.2.4 Vessel Ventilation Off-gas Treatment

The vessel ventilation off-gas system prevents migration of waste contaminates into the process cells and operating areas. It does this by maintaining the various LAW process vessels under a slight vacuum relative to the cell. The composition of the ventilation air is expected to be primarily air with slight chemical and radioactive particulate contamination.

The vessel ventilation air is combined with the melter off-gas prior to entering the secondary off-gas system HEPA filter pre-heater. The combined air streams are treated together in the remaining sections of the secondary off-gas treatment systems. A pressure control device is used to regulate the pressure between the vessel ventilation off-gas system and the melter off-gas system.

2.2.5 LAW Secondary Off-gas/Vessel Vent Process System

The melter off-gas stream that is treated through the primary off-gas system is combined with the vessel ventilation off-gas stream and treated through the LAW secondary off-gas/vessel vent process system. This system removes the remaining particulate, miscellaneous acid gases, gaseous NO_x, and volatile organic compounds. Major components in the system include the HEPA pre-heaters and filters, catalytic oxidizer and reducer unit, and a caustic scrubber. Descriptions of these components are provided below.

<u>HEPA Pre-Heaters, Filters and Exhauster</u>

The off-gas is heated, using an electric pre-heater, to a temperature above the gas stream's dew point and then passed through dual set of HEPA filters to provide high efficiency submicron removal. The off-gas is heated to avoid condensation in the HEPA filters. The HEPA filters provide a combined particulate removal efficiency greater than 99.9995%. When the differential pressure drop across the filters becomes too high, they will be manually changed out. The system is comprised of two HEPA filter trains. The off-gas passes through one filter train while the other remains available as an installed backup.

Carbon Bed Adsorbers

Two parallel carbon beds will be provided after the exhaust fans and will be arranged in a lead/lag configuration to allow continued operation media change out. The carbon beds will be located upstream of the thermal catalytic oxidizer and reducer unit (TCO/SCR) to remove mercury and halides that have been identified as TCO/SCR catalyst poisons.

Catalytic Oxidizer/Reducer Unit

To remove volatile organic compounds and NO_x in the off-gas stream, a catalyst skid mounted unit with a combined thermal catalytic oxidizer unit and a NO_x selective catalytic reduction unit will be used. These units incorporate a heat recovery exchanger, an electric heater, a thermal catalyst bed, and a NO_x selective catalytic reduction bed. In this catalyst skid, organic compounds are oxidized to carbon dioxide (CO_2), water vapor, and possibly acid gases (depending on the halogenated volatile organic compound present in the stream). Also, NO_x is reacted with ammonia to reduce it to nitrogen gas and water vapor. The catalytic reduction unit has little effect in removing particulate radionuclides that may be present in the off-gas/vessel vent stream. However, particulate radionuclides will have been removed upstream by HEPA filtration.

The VOC catalyst column operates at a somewhat lower temperature than the NO_x catalyst; therefore, it is placed at the beginning of the unit. This arrangement also prevents the formation of NO_x through the volatile organic compound catalyst from the oxidation of ammonia, which is added after the gas goes through the VOC catalyst. Further off-gas heating will occur through the VOCs catalyst, as the reactions occurring will be exothermic.

As the off-gas enters the unit, it travels through the heat recovery unit, which is a plate heat exchanger. The heating medium used is the exhaust from the catalytic oxidizer/reducer unit. The cool off-gas enters the cold side of the heat recovery, then passes through an electric heater to bring the temperature up to that required for the volatile organic compound catalyst to operate.

After the volatile organic compound catalyst, the off-gas enters a chamber where an ammonia solution is injected through an atomized spray and allowed to mix with the off-gas. Ammonia is added so that the NO_x reduction reactions can be carried out. Two sets of NO_x catalyst modules are required to achieve the required removal efficiency of greater than 95%. The off-gas is treated through the first set of NO_x catalyst modules. After the first module, more urea is injected into the stream to allow further conversion in the second set. The off-gas then goes through the second catalyst module. Reduction of NO_x is also an exothermic reaction; therefore, it significantly increases the off-gas temperature. This hot off-gas then enters the hot side of the heat recovery unit to heat the incoming off-gas. The cooled off-gas stream is then directed to the caustic scrubber for iodine removal, acid gas removal, and final cooling.

Caustic Scrubber

The caustic scrubber further treats the melter off-gas by removing ^{129}I and acid gases, and providing final off-gas cooling. The off-gas stream enters the bottom of the scrubber and flows upward through a packed bed. Contaminants in the off-gas stream are absorbed into the liquid stream through the interaction of the gas, liquid, and packing media. To neutralize the collected acid gases, a sodium hydroxide solution is added periodically. The treated off-gas is then discharged through a mist eliminator to prevent droplet carryover. After the caustic scrubber, the off-gas is released to the environment via the LV-S3 emission unit.

2.2.6 Immobilized Low Activity Waste (ILAW) Glass Container

The decontaminated immobilized low-activity waste (ILAW) containers will be shipped directly to a Hanford Site burial trench for disposal.

The ILAW containers will be constructed of steel that is physically and chemically compatible with the glass waste. All of the ILAW containers will be closed by means of mechanical sealing that will meet the ANSI 14.5 standard for reusable radiological shipping containers. Visual inspection will be conducted to ensure complete closure. Under normal operating conditions, the ILAW containers are not expected to produce non-radioactive air emissions.

2.3 HLW Vitrification Plant Off-gas System

The HLW vitrification plant will consist of eight separate emission units: HV-C2, HV-C2R (reagent storage room), HV-S1, HV-S2, HV-S3A and HV-S3B (second HLW melter emission unit), HV-S4, and IHLW-S1. The emission sources to HV-C2, HV-C2R, HV-S1, and HV-S2 will consist of off-gases from plant building ventilation systems and will not emit non-radionuclide emissions. The emissions flowing to HV-S3A and HV-S3B will consist of off-gases from the HLW melters and process vessels. These streams are expected to contain particulates, radioactive gases, volatile organics, and acid gases with relatively high temperature and moisture content. The emissions from HLW RFDs and PJMs will be vented through HV-S4.

The following sections provide a description of the proposed off-gas control system for the HLW vitrification plant.

2.3.1 HLW Melter Off-gas Treatment Process System

The HLW melter off-gas treatment process system consists of the following systems:

- HLW primary off-gas process system
- HLW vessel vent process system
- HLW secondary off-gas process system

Melter off-gas will be generated from the vitrification of HLW in the Joule-heated ceramic melter. The rate of generation of gases in the melter is dynamic and not steady state. The melter will generate off-gas resulting from decomposition, oxidation, and vaporization of feed material. Constituents of the off-gas will include:

- Nitrogen oxides (NOx)
- Chloride, fluoride, and sulfur as oxides, acid gases, and salts
- Radionuclide particulates and aerosols

In addition, the HLW melter generates small quantities of other volatile compounds, including ^{129}I, ^{14}C, ^{3}H, and volatile organic compounds.

The purpose of the HLW off-gas treatment process system is to cool and treat the melter off-gas and vessel ventilation off-gas to a level that is protective of human health and the environment. The off-gas system must also provide a pressure confinement boundary that will control melter pressure and prevent vapor release to the plant. The design of the melter off-gas system must accommodate changes in off-gas flow from the melter without causing the melter to pressurize.

Initial decontamination of off-gas from the melter is provided by the primary off-gas treatment system. This primary off-gas system is designed to handle intermittent surges of seven times steam flow and three times non-condensable flow from feed. The primary system consists of a film cooler, an SBS, a wet electrostatic precipitator, a high efficiency mist eliminator, and two stages of HEPA filtration. This system cools the off-gas and removes particulates.

Additionally, an extra line from the melter to the SBS is provided in the unlikely case that the primary off-gas line plugs. This extra line includes a valve as the isolation device. As soon as the melter vacuum decreases to a set point, the valve is actuated and off-gas flow is allowed through the line to the SBS, thereby preventing melter pressurization. In the event that the melter surge is much higher than the system is designed to handle, a pressure relief device acts as the pressure relief point venting the off-gas to the melter cell.

The vessel ventilation header joins the primary off-gas system after the wet electrostatic precipitator. After passing through the HEPA filters, the off-gas is routed to the secondary off-gas treatment system. The off-gas received through the vessel ventilation system consists primarily of air, water vapor, and minor amounts of aerosols generated by the agitation or movement of vessel contents.

The secondary off-gas system is designed to handle the maximum sustained flow rate from the melter. The secondary off-gas system consists of, exhauster fans (two sets), a carbon bed adsorber, a heat recovery unit, a silver mordenite adsorption unit, and a catalytic oxidizer and reducer unit. The following sections provide descriptions of major melter offgas treatment components.

2.3.2 Primary Melter Off-gas Treatment System

The purpose of the primary off-gas treatment system is to cool the melter off-gas and to remove off-gas aerosols generated by the melter and from the vessel ventilation air. This treatment system consists of a film cooler, an SBS, a wet electrostatic precipitator, a high efficiency mist eliminator, an electric heater, and high efficiency particulate air filters. Each of the HLW melters will have a dedicated off-gas treatment system, and the following descriptions apply to both melter off-gas treatment systems.

<u>Film Cooler</u>

The function of the film cooler is to cool the off-gas below the glass sticking temperature to minimize solids deposition on the off-gas piping walls. The off-gas exits the melter and is mixed with air in the off-gas film cooler. Each melter has a film cooler. The film cooler is a double-walled pipe designed to introduce injected gas axially along the walls of the off-gas pipe through a series of holes or slots in the inner wall.

A mechanical reamer may be mounted on the film cooler to periodically remove solids build-up on the inner film cooler wall. The reaming device (wire brush or drill) would be periodically inserted into the film cooler for mechanical solids removal.

<u>Submerged Bed Scrubber</u>

The off-gas from the HLW melter is further treated by an SBS. The off-gas enters the SBS column for further cooling and solids removal. The SBS is a passive device designed for aqueous scrubbing of entrained radioactive particulate from melter off-gas, cooling and condensation of melter vapor emissions, and interim storage of condensed fluids. It will also quench the off-gas to a desired discharge temperature through the use of cooling coils/jacket. The off-gas leaves the SBS in thermal equilibrium with the scrubbing solution.

The SBS has two off-gas inlets, one for the normal operations line and one for the standby line. The off-gas enters the SBS through the appropriate inlet pipe that runs down through the center of the bed to the packing support plate. The bed-retaining walls will extend below the support plate creating a lower skirt which will allow the formation of a gas bubble underneath the packing. The entire bed is suspended off the floor of the SBS to allow the scrubbing solution to circulate freely through the bed. After formation of the gas bubble beneath the packing, the injected off-gas then bubbles up through the packed bed. The rising gas bubbles also cause the scrubbing liquid to circulate up through the packed bed, resulting in a general recirculation of the scrubbing solution. The packing breaks larger bubbles into smaller ones to increase the gas to water contacting surface, thereby increasing particulate removal and heat transfer efficiencies. The warmed scrubbing solution then flows downward outside of the packed bed through cooling coils/jacket. The scrubbed off-gas discharges through the top of the SBS and is routed to the wet electrostatic precipitator for further particulate removal.

Wet Electrostatic Precipitator

The SBS off-gas is routed to the WESP for removal of aerosols down to and including sub-micron size. The off-gas enters at the top of the unit and may pass through a distribution plate. The evenly distributed saturated gas then flows downward through the tubes. The tubes act as positive electrodes. Each of these tubes has a single negatively charged electrode, which runs down the centerline of each tube. A high voltage, direct current transformer supplies the power to the electrodes. A strong electric field generated along the electrodes will give a negative charge to the aerosols. The negatively charged particles move toward the positively charged tube walls for collection. Collected particles are then washed from the tube walls along with collected mists. As the gas passes through the tubes, the first particles captured are the water droplets. As the water droplets gravity drain through the electrode tubes, the collected particles are washed off, and the final condensate is collected in the wet electrostatic precipitator dished bottom area. A water spray may be used periodically to facilitate washing collected aerosols from the tubes. The tube drain and wash solution are routed to a collection vessel.

High Efficiency Mist Eliminator

Further removal of radioactive aerosols is accomplished using the HEME. The HEMEs also reduce the dust-loading rate on the HEPA filters. A HEME is essentially a high efficiency demister that has a removal efficiency of greater than 99% for aerosols down to the sub-micron size. As the off-gas passes through the HEME, the liquid droplets and other aerosols within the off-gas interact with HEME filaments. As the aerosols contact the filaments, they adhere to the filaments surface by surface tension. As the droplets agglomerate and grow, they eventually acquire enough mass to fall by gravity to the bottom of the unit, thus overriding the original surface tension, friction with the filaments, and the gas velocity. These collected droplets will contain the majority of the off-gas radioactivity and will be collected in the bottom of the HEME. The condensate will collect and gravity drain into an SBS condensate vessel. As the condensate flows down through the filter bed, a washing action is generated that will help wash collected solids from the filter elements. However, some solids may accumulate in the bed over time, causing the pressure drop across the filter to increase. When the pressure drop across the HEME reaches a predefined level, it is washed with process water to facilitate removal of accumulated solids. Some insoluble solids may remain, and their accumulation will eventually lead to the replacement of the HEME filter elements.

HEPA Pre-Heaters, Filters and Exhauster

The off-gas is heated using an electric pre-heater to a temperature above the gas stream's dew point and then passed through dual set of HEPA filters to provide high efficiency submicron removal. The off-gas is heated to avoid condensation in the HEPA filters. The HEPA filters provide a combined particulate removal efficiency greater than 99.9995%. When the differential pressure drop across the filters becomes too high, they will be remotely changed out. The system is comprised of two parallel heater/HEPA filter trains. The off-gas passes through one train while the other remains available as an installed backup.

2.3.3 Standby Primary Off-Gas Treatment System

The standby line consists of an off-gas duct from the melter to the SBS and a pressure relief device. The standby off-gas duct will extend to the bottom of the SBS packed bed, identical to the main off-gas line. It is the same size as the main off-gas line, thus providing a doubling of flow cross-section for melter-generated gases. During the unlikely event of melter surge, the pressure relief valve will open rapidly, providing an alternative path for the melter off-gas to flow. With this alternative routing, pressure control on the melter plenum can be maintained.

2.3.4 Vessel Ventilation Off-Gas Treatment

The vessel ventilation off-gas system prevents migration of waste contaminates into the process cells and operating areas. It does this by maintaining the various HLW process vessels under a slight vacuum relative to the cell. The composition of the ventilation air is expected to be primarily air with slight chemical and radioactive particulate contamination.

The vessel ventilation air is combined with the melter off-gas prior to entering the primary off-gas system HEMEs. The combined air streams are treated together in the remaining sections of the primary and secondary off-gas treatment systems. A pressure control device is used to regulate the pressure between the vessel ventilation off-gas system and the melter off-gas system.

2.3.5 HLW Pulse Ventilation System

Gaseous emissions are produced by RFDs and PJMs that are used to mix and move wastes in the HLW vitrification plant. The exhaust from RFDs and PJMs throughout the HLW vitrification plant is collected in the pulse ventilation system headers. This exhaust is potentially contaminated with aerosols and particulates. Electric pre-heaters eliminate liquid aerosols and reduce the relative humidity of the gas stream, as necessary, before it encounters the system HEPA filters. The gas is passed through HEPA filters to remove particulates that may be present. When the differential pressure drops or radiation levels across the filters become too high, they will be remotely changed out.

2.3.6 Secondary Off-Gas Treatment System

The combined primary off-gas stream and vessel ventilation off-gas stream are discharged to the secondary off-gas treatment system. The secondary off-gas system will treat the combined off-gas to a level protective of human health and the environment. Specifically, the secondary off-gas treatment system will remove radioactive iodine, volatile organic compounds, and acid gases, as required, to meet the facilities' air discharge requirements. The secondary off-gas treatment system consists of carbon bed adsorbers, silver mordenite column, an organic thermal catalytic oxidizer unit, and a NO_x SCR unit.

Carbon Bed Adsorbers
Two parallel carbon beds will be provided after the exhaust fans and will be arranged in a lead/lag configuration to allow continued operation media change out. The carbon beds will be located upstream of the thermal catalytic oxidizer and reducer unit (TCO/SCR) to remove mercury and halides from the off-gas and serve to prevent mercury from fouling the TCO/SCR catalyst.

Silver Mordenite Adsorber.

The silver mordenite adsorber is present to remove halogens such as radioactive iodine, fluorine, and chlorine from the melter off-gas. Silver mordenite is an absorbent in the form of cylindrical pellets contained in cartridges. The absorbent is expected to lose effectiveness over time and will require replacement. Halogens react with the silver in the bed and are trapped within the matrix. Loading begins at the front of the silver mordenite beds and progressively loads the silver through the column until breakthrough is reached at the end of the column. Absorption reactions occur within a reaction zone (or mass transfer zone) that varies in length, depending on the temperature of the bed and the gas velocity through the bed. The column structure is similar to that in a carbon bed absorber. The adsorber unit is not a tank-like structure, but is instead a bank of cartridges through which the gas stream is directed. The absorbent cartridges allow for manual removal and replacement, when required or after a predetermined life span, and are sized to fit into standard waste drums for disposal.

Catalytic Oxidizer/Reducer Unit

To remove volatile organic compounds and NO_x in the off-gas stream, a catalyst skid mounted unit with a combined thermal catalytic oxidizer unit and a NO_x selective catalytic reduction unit will be used. These units incorporate a heat recovery exchanger, an electric heater, a thermal catalyst bed, and a NO_x selective catalytic reduction bed. In this catalyst skid, organic compounds are oxidized to carbon dioxide, water vapor, and possibly acid gases (depending on the halogenated volatile organic compound present in the stream). Also, NO_x is reacted with ammonia to reduce it to nitrogen gas and water vapor.

The VOC catalyst column operates at a somewhat lower temperature than the NO_x catalyst; therefore, it is placed at the beginning of the unit. This arrangement also prevents the formation of NO_x through the VOC catalyst from the oxidation of ammonia, which is added after the gas goes through the VOC catalyst. Further off-gas heating will occur through the VOC catalyst, as the reactions occurring are exothermic.

As the off-gas enters the unit, it travels through the heat recovery unit, which is a plate heat exchanger. The heating medium used is the exhaust from the catalytic oxidizer/reducer unit. The cool off-gas enters the cold side of the heat recovery, then passes through an electric heater to bring the temperature up to that required for the volatile organic compound catalyst to operate.

After the volatile organic compound catalyst, the off-gas enters a chamber where gaseous ammonia is injected through an atomized spray and allowed to mix with the off-gas. Ammonia is added so that the NO_x reduction reactions can be carried out. Reduction of NO_x is also an exothermic reaction; therefore, it significantly increases the off-gas temperature. This hot off-gas then enters the hot side of the heat recovery unit to heat the incoming off-gas.

2.3.7 Immobilized HLW (IHLW) Glass Canister Storage

The decontaminated IHLW canisters are stored at a the IHLW canister storage area, which is located in the HLW vitrification plant.

The IHLW containers will be constructed of steel. The steel will be physically and chemically compatible with the glass waste. All of the IHLW canisters will be sealed through welding. Visual inspection will be conducted to ensure complete closure. Under normal operating conditions, the IHLW canisters are not expected to produce emissions. Therefore, no controls will be provided for the IHLW canister storage area.

2.3.8 Melter Off-Gas Maintenance Bypass System

The HLW and LAW melters are equipped with a maintenance ventilation line that bypasses the SBS and WESP units. The purpose of this line is to provide melter ventilation during idling conditions in the unlikely event that the SBS or WESP requires maintenance. Prior to initiating use of the maintenance ventilation line, waste feed will be halted and the melter placed into an idle condition. No waste feed would be fed to the melters when the maintenance ventilation line is in use.

The maintenance ventilation line may also find use during commissioning when the plant is running on non-radioactive, non-dangerous simulants. The maintenance ventilation line could also be used if maintenance was required for the melter standby or duty off-gas lines connecting the melter and the SBS, or the standby off-gas line actuation valve. In this case, the standby and duty lines would be isolated, for example, by valves, spectacle flanges, or hydraulically (by raising the level in the SBS).

Idling emissions from the melter are mainly heated air at about 1/5 to 1/10 the gas volume expected during slurry feeding. The gas will still be processed through the secondary off-gas treatment system that includes HEPA filtration, thermal catalytic oxidation, and selective catalytic reduction.

2.4 WTP Building Ventilation

The pretreatment, LAW vitrification, and HLW vitrification plants building ventilation systems requiring controls are:

- C2 area ventilation
- C3 area ventilation
- C5 area ventilation

The C2 areas typically will consist of non-process operating areas, access corridors, and control/instrumentation and electrical rooms. Filtered air will be supplied to these areas by the C2 supply system and will be cascaded into adjacent C3 areas or HEPA filtered and exhausted by the C2 exhaust system.

The C3 areas typically will consist of filter plant rooms, workshops, maintenance areas, and monitoring areas. Access from a C2 area to a C3 area will be via a C2/C3 sub-change room. Air will generally be drawn from C2 areas and cascaded through the C3 areas into C5 areas. The C3 air that is not cascaded to C5 areas is passed through HEPA filters and discharged to the atmosphere.

The C5 areas typically will consist of a series of process cells where waste will be stored and treated. The hot cell will house major pumps and valves and other process equipment. Air will be cascaded into the C5 areas, generally from adjacent C3 areas, and extracted by the C5 extract system. The C5 exhaust system will be comprised of HEPA filters and variable speed fans. Fans designed to maintain continuous system operation will drive the airflow. This system will also be interlocked with the C3 area ventilation system to prevent backflow by shutting down the C3 system if the C5 area ventilation system shuts down. The C5 air is passed through HEPA filters and discharged to the atmosphere.

2.5 Analytical Laboratory Off-Gas System

The WTP analytical laboratory will provide support for process control, waste form compliance, regulatory analysis for air, liquid, soil and sludge samples, and tank farm core and grab samples. Radionuclide particulate and aerosols are expected in the analytical laboratory exhaust systems due to the handling and analysis of various samples.

The WTP laboratory will be composed of analytical hot cell laboratory equipment system (AHL) and analytical radiological laboratory equipment system (rad labs). Sample conveyance systems will automatically transport samples from the other process plants to the analytical laboratory. High-activity samples will be managed in a hotcell area that will contain hot cells dedicated to sample receipt, sample fusion, acid digestion, and dilution to support specific analytical techniques or functions in the analytical radiological laboratories. The hot cell exhaust will be handled as C5 ventilation system and the exhausts from C5 ventilation will be vented through the C5 emission unit (LB-S2). This stream will be filtered through a two-stage HEPA filtration system.

The analytical radiological laboratory will support analyses of low and medium radioactive samples. Each laboratory will have specific analytical equipment to perform the intended function. Fume hoods within these laboratories will be handled by the C3 ventilation system and vented through emission unit LB-S1. This stream is processed through one stage of HEPA filtration. The building ventilation air associated with general laboratory work areas or offices will be vented through emission unit LB-C2. This stream is processed through a one-stage HEPA filtration system.

2.6 Balance of Facility Off-Gas Controls

Based on the anticipated activities and emission analyses, the glass former storage area is the only area that will be equipped with controls for criteria air pollutant emissions.

The outdoor storage area will contain the material storage silos, weight hoppers, transporters, blending silos, and blended glass former transporters. The storage silos and blending silos will have bag-houses to minimize emissions during loading and unloading. To further limit emissions, transfer of the glass formers between the weigh hoppers, the blending silos, and the melter feed hoppers will occur through sealed, dense-phase pneumatic conveying.

THEREFORE, IT IS ORDERED that the project as described in said Notice of Construction application, and more specifically detailed in plans, specifications, and other information, submitted to the Washington State Department of Ecology in reference thereto, is approved for construction, installation and operation, provided the following conditions are met:

<u>APPROVAL CONDITIONS</u>:

1. EMISSIONS CONTROL

1.1 Opacity from each exhaust stack from process facilities (Pretreatment, HLW and LAW) shall not exceed 5%, other facility stacks shall not exceed 10%, over a 6 minute average as measured by EPA Reference Method 9, or an equivalent method approved in advance by Ecology. A certified opacity reader shall read and record the opacity concurrent with any source testing.

1.2 All boilers, generators and the diesel fire pump shall be fired on Ultra-Low Sulfur Fuel (ULSF), ULSF means natural gas, propane, or fuel oil with a sulfur content of 0.0030 % or less. Compliance shall be monitored by maintaining and submitting records of fuel purchases.

1.3 Three of the steam generating boilers shall not exceed 8,760 hours per year, and three shall not exceed 3,679 hours per year on a 12 month rolling summation calculated once per month. Compliance shall be monitored by installing and operating non-resetable totalizers on each boiler.

1.4 Each of the three emergency generators shall not operate for more than 164 hours per year on a 12 month rolling summation calculated once per month. Compliance shall be monitored by installing and operating non-resetable totalizers on each generator.

1.5 Each of the two diesel fire pumps shall not operate for more than 110 hours per year on a 12 month rolling summation calculated once per month. Compliance shall be monitored by installing and operating a non-resetable totalizer on the fire pump.

2. TOTAL EMISSION LIMITS

2.1 The activities described in the NOC application will be permitted with the control technologies proposed, provided that the total emissions from all activities will not result in exceedance of WAC 173-460 ASILs or the criteria pollutants estimate listed under the Emissions section of this order.

2.2 A new NOC will be required, if total emissions of toxic air pollutants exceed the values specified in the tables in Attachment 1. These values shall be confirmed by emission calculations, for indicator constituents, derived from waste characterization data obtained through implementation of the Ecology approved Regulatory Data Objectives Supporting Tank Waste Remediation System Privatization Project (PNNL-12040). The mass feed rates for the indicator constituents will be verified to be less than or equal to the mass feed rates used in the *Integrated Emissions Baseline Report for the Hanford Tank Waste Treatment and Immobilization Plant* (24590-WTP-RPT, PO-03-008, Rev 0). Results of any such calculations will be maintained on file and made available upon inspection/request.

2.3 A new NOC also is required if total emissions of any criteria pollutants, derived from calculations/monitoring, would exceed the estimates listed under the Emissions section of this order.

3. GENERAL TESTING REQUIREMENTS

3.1 Within 180 days of achieving the optimized feed rate of simulant at which the LAW and HLW vitrification facilities will be operated, the permittee shall demonstrate initial compliance through a performance demonstration conducted per an Ecology approved Performance Demonstration Plan. The permittee shall utilize the Performance Demonstration Plan requirements identified in the *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste Hanford Waste Treatment and Immobilization Plant (DWP)*, condition III.10.H.5.f (LAW) and III.10.J.5.f (HLW). Ecology shall be notified at least 30 days prior to the test and invited to participate in the test activities at least one week prior to testing.

3.2 Testing per the initial compliance testing identified in 3.1 shall be conducted in accordance with the frequency identified in the DWP, conditions III.10.I.1.h (LAW) and III.10.K.1.h (HLW).

3.3 The permittee shall provide to Ecology written reports of all compliance testing associated with the 3.1, 3.2, and 3.5 within 90 days of the test date.

3.4 Sampling ports and platforms for testing must be provided by the permittee. The ports must meet the requirements of Title 40 Code of Federal Regulations Part 60 (40 CFR 60), Appendix A, Method 1, 7/1/00. Adequate permanent and safe access to the test ports must be provided.

3.5 Within 180 days of initial startup, boiler source testing shall be conducted according to the following methods, unless an alternate method has been proposed in writing by the permittee and approved by Ecology in writing in advance of the testing.

3.5.1 Carbon Monoxide – EPA Reference Method 10, 40 CFR 60, Appendix A, 7/1/00

3.5.4 Volatile Organic Compounds (VOC) – EPA Reference Method 18, 40 CFR 60, Appendix A, 7/1/00

3.5.5 Sulfur Dioxide – EPA Reference Method 6C, 40 CFR 60, Appendix A, 7/1/00.

3.6 During the boiler source testing described in 3.5 above, a direct-reading measurement device for carbon monoxide with a minimum measurement accuracy of five percent or less shall take readings according to methods proposed by the permittee and approved by Ecology in writing in advance of the testing. The direct-reading instrument shall be calibrated for future use, using the results of the source testing.

4. EMISSION CONTROL MONITORS

Emissions from boilers and generators shall be monitored for CO, and Oxygen by means of a portable emissions analyzer (direct-reading measurement device) at initial startup and after routinely scheduled maintenance activities and burner/control adjustments such as fuel/air metering ratio control and oxygen trim control.

5. MANUALS

Within 90 days of startup USDOE shall identify operational parameters and practices that will constitute proper operation of the Pretreatment plant, LAW vitrification plant, the HLW vitrification plant, the Laboratory, and the BOF that have the potential to affect emissions to the atmosphere, including but not limited to, the steam boilers, the hot water boilers and the emergency generators. These operational parameters and practices shall be included in an Operations and Maintenance (O&M) manual for the facility. The O&M manual shall be maintained and followed by the USDOE and shall be available for review by state, federal and local agencies. The O&M manuals shall be updated to reflect any modifications of the process or operating procedures. The Pretreatment plant, LAW vitrification plant, the HLW vitrification plant, the laboratory, and the BOF shall be properly designed, operated and maintained. Failure to follow the requirements of the O&M Manual and the adequacy of the O&M Manual will be two of the factors considered by Ecology in determining whether these sources are properly designed, operated, and maintained. Emissions that result from a failure to follow the requirements of the O&M manual may be considered credible evidence that emission violations have occurred.

6. INITIAL NOTIFICATIONS & SUBMITTALS

All notifications and submittals required under these Approval Conditions shall be sent to:

Washington State Department of Ecology
Nuclear Waste Program
1315 West Fourth Avenue
Kennewick, Washington 99336-6018

7. MONITORING and RECORDKEEPING

Specific records shall be kept on-site by the Permittee and made available for inspection by Ecology upon request. The records shall be organized in a readily accessible manner and cover a minimum of the most recent 60 month period. The records to be kept shall include, but not be limited to, the following:

7.1 Calculations of TAPs emissions derived from waste feed characterization

7.2 Calculations of ammonia emissions from LAW and HLW

7.3 Records of monthly fuel purchases and an annual certification, from the fuel distributor, stating the sulfur content of the fuel that was supplied

7.4 Logs of boiler tune-ups and significant boiler maintenance activities will be maintained

8. GENERAL CONDITIONS

8.1 **Fugitive Dust Control**: A Construction Phase Fugitive Dust Control Plan, prepared using EPA and Ecology guidelines, shall be developed and implemented. A copy of this plan shall be maintained on-site at all times in a place known to facility employees that are responsible for complying with the requirements contained therein and shall be retrievable by those employees at all times when activities regulated by the documents are occurring. These documents shall be made available to Ecology upon request.

8.2 **Commencing/Discontinuing Construction and/or Operations:** This approval shall become void if the proposed activities are not commenced within 18 months after receipt of this Order approving the NOC application, or if activities are discontinued for a period of eighteen 18 months.

8.3 **Compliance Assurance Access**: Access to the source by the United States Environmental Protection Agency, or Ecology, shall be allowed for the purposes of compliance assurance inspections. Failure to allow access is grounds for revocation of the Order approving the NOC.

8.4 **Modification to Facility or Operating Procedures**: Any modification to any equipment or operating procedures, contrary to information provided in the NOC application, shall be reported to Ecology at least 60 days before such modification. Such modification may require a new, or amended, NOC approval Order.

8.5 **Activities Inconsistent with this Order**: Any activity undertaken by the Permittee or others, in a manner that is inconsistent with the NOC application, and this determination, shall be subject to Ecology enforcement under applicable regulations.

8.6 **Obligations under Other Laws or Regulations**: Nothing in this Order shall be construed to relieve the Permittee of its obligations under any local, state, or federal laws, or regulations.

8.7 Nothing in this approval shall be construed as obviating compliance with any requirement of law other than those imposed pursuant to the Washington Clean Air Act, and rules and regulations there under.

8.8 A two month testing and break-in period is allowed, after any part or portion of this project becomes operational, to make any changes or adjustments required to comply with applicable rules and regulations pertaining to air quality and conditions of operation imposed herein. Thereafter, any violation of such rules and regulations, or of the terms of this approval, shall be subject to the sanctions provided in Chapter 70.94 RCW.

Authorization may be modified, suspended or revoked in whole, or part, for cause including, but not limited to, the following:

1. Violation of any terms or conditions of this authorization

2. Obtaining this authorization by misrepresentation, or failure to disclose fully all relevant facts

The provisions of this authorization are severable and, if any provision of this authorization, or application of any provisions of this authorization to any circumstance, is held invalid, the application of such provision to their circumstances, and the remainder of this authorization, shall not be affected thereby.

Any person feeling aggrieved by this ORDER may obtain review thereof by application, within 30 days of receipt of this ORDER, to:

Pollution Control Hearings Board
P.O. Box 40903
Olympia, Washington 98504-0903

Concurrently, copies of the application must be sent to:

Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Washington State Department of Ecology
1315 West Fourth Avenue
Kennewick Washington 99336-6018

These procedures are consistent with the provisions of Chapter 43.21B RCW, and the rules and regulations adopted there under.

DATED at Kennewick, Washington, this the 24th day of November 2003.

PREPARED AND REVIEWED BY:

Jerry Hensley

Jerry Hensley, P.E.

APPROVED BY:

Michael A. Wilson

Michael A. Wilson